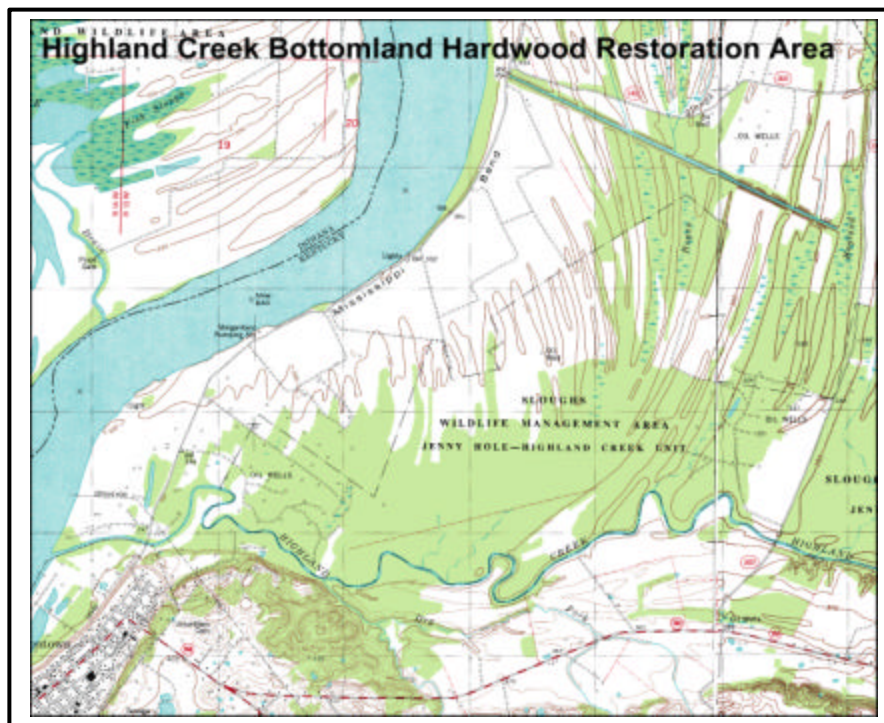


Highland Creek Bottomland Hardwood Restoration (KY-17)

1.0 Location

The proposed Highland Creek Bottomland Hardwood Restoration area consists of approximately 2,500 acres and is located in Union County, Kentucky just northeast of the town of Uniontown. The project area is located adjacent to Myers Pool between Ohio River Miles (ORM) 838.5-842. The Kentucky Department of Fish and Wildlife Resources (KDFWR) Sloughs Wildlife Management Area (WMA) borders much of the proposed project area. The project site is within the jurisdiction of the Louisville District, U.S. Army Corps of Engineers (USACE).



2.0 Project Goal, Description, and Rationale

The main goal of this project is to restore bottomland hardwood forests and wetlands within the project area and provide a buffer to the existing publicly-owned bottomland hardwood forest and wetlands. Bottomland hardwood wetlands are the most valuable wetland types in Kentucky. Most of the land within the proposed project area is privately-owned agricultural land that would be purchased from willing sellers. The restored bottomland hardwood forests would provide seasonal or year-round habitats for a variety of species, promote clean water, reduce soil erosion and stream sedimentation, and provide increased recreational opportunities.



A secondary goal of this project is to improve the embayment area near the mouth of Highland Creek to enhance aquatic habitat for fish and improve accessibility for boating. This embayment area, like many others along the Ohio River, has become silted in over the years due to dam induced changes in adjacent river (pool) elevations. As the embayments become silted in, they no longer provide habitat for fish and wildlife and they restrict the movement of fishes. Also, the shallow water prohibits boats from entering the streams resulting in decreased fishing, hunting, and other recreational opportunities. Improvement of the embayment area would involve dredging to deepen the entrance and lower channel of Highland Creek and construction of a rock revetment to create a scour hole at the mouth of the creek. Restoration of the embayment would provide higher quality habitat for fish, improve seasonal passage of fishes and other aquatic organisms, and provide increased recreational opportunities.

3.0 Existing Conditions

Terrestrial/Riparian Habitat: Approximately 30% of the land within the project area is currently forested. However, most of the forests occur in narrow bands and small fragments, especially those adjacent to the Ohio River. The remaining land is primarily in active agricultural production.

Aquatic Habitats: The embayment area at the mouth of Highland Creek has become filled with silt and sediments. The shallow opening to Highland Creek contains a few stumps and fallen trees, however the overall quality of the embayment habitat is low.



Wetlands: Wetlands on the project area consist of seasonally flooded riparian areas near the Ohio River and Highland Creek, some of which may be jurisdictional. Numerous bottomland hardwood wetlands likely occurred on the area before the land was converted into cropland.

Federally-Listed Threatened and Endangered Species: According to the U.S. Fish and Wildlife Service (USFWS), there are three federally-listed endangered species and two federally-listed threatened species known to occur in Union County, Kentucky. These species are listed on Table 1.

The riparian corridor adjacent to the Ohio River may provide summer roost habitat for the Indiana bat. Preferred tree species would include a mixture of oaks (*Quercus* spp.), silver maple (*Acer saccharinum*), cottonwood (*Populus deltoides*), and shagbark hickory (*Carya ovata*) (INHS, 1996). The riparian corridor would also provide feeding/foraging habitat for the Indiana bat.

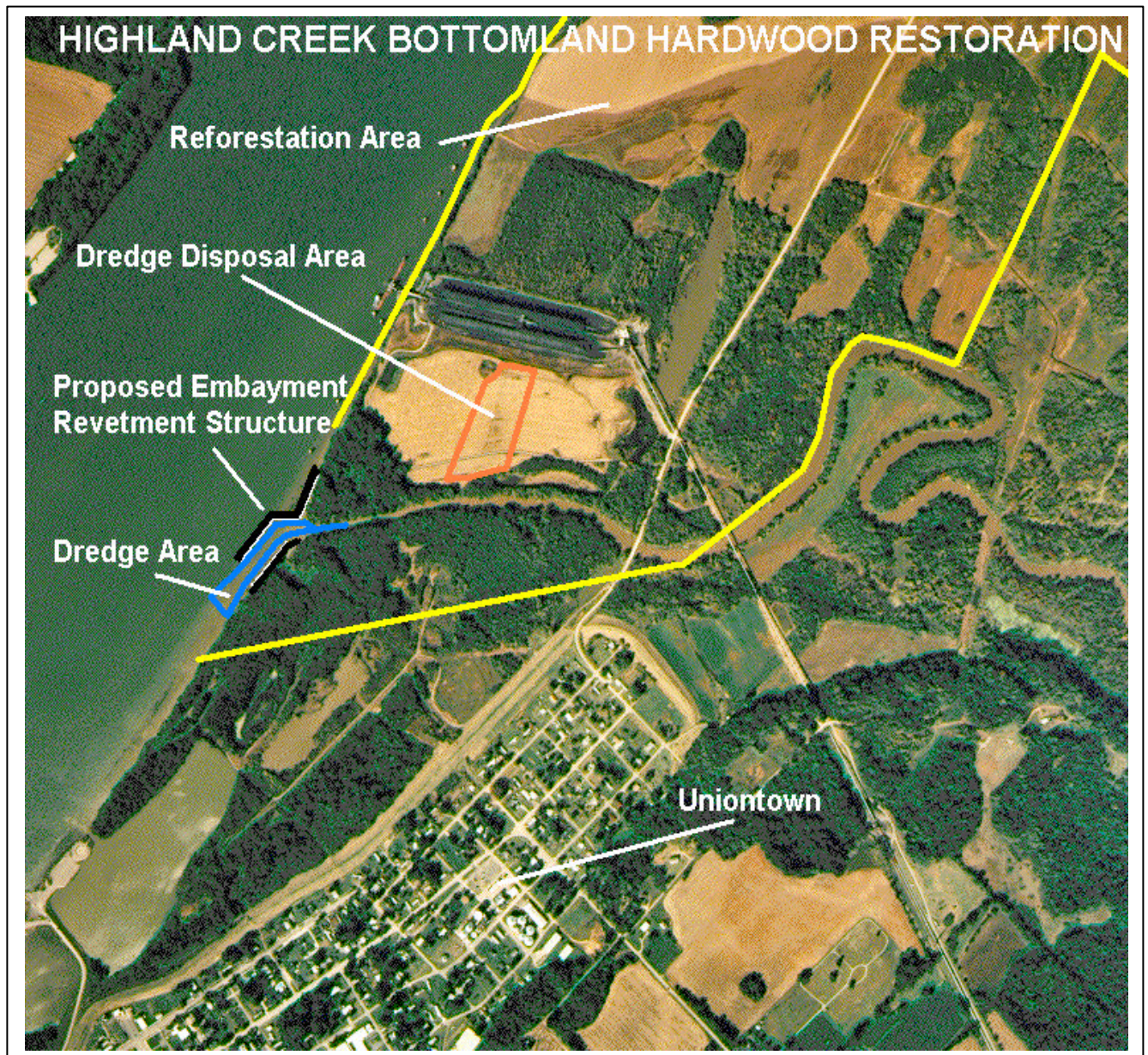
Bald eagles may utilize forested areas for roosting/perching habitat and feed in the open water areas. No known eagle nests exist in the project area.

The interior least tern and the piping plover are typically associated with sandbar habitats in large river systems. Open sandbar habitats are used as nesting/brood rearing habitat and shallow water areas are used for feeding. There does not appear to be suitable least tern or piping plover habitat near the project area, because the mouth of Highland Creek is just upstream from the Myers Lock and Dam. The operation of the Myers pool restricts the formation of sandbar/island habitat, especially in the lower end of the pool.

The fat pocketbook mussel is a freshwater species that typically inhabits large river systems. The mussel is typically found in habitats with muddy or sandy substrates and slow flowing water. Due to the slackwater conditions in the lower Myers Pool, there does not appear to be suitable habitat for this species within the Highland Creek Embayment.

Table 1. Federally-listed species known to occur in Union County, Kentucky.			
Common Name	Scientific Name	Federal Status	Potential Habitat Present
Indiana bat	<i>Myotis sodalis</i>	Endangered	Yes
bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened	Yes
interior least tern	<i>Sterna antillarum</i>	Endangered	No
piping plover	<i>Charadrius melodus</i>	Threatened	No
fat pocketbook	<i>Potamilus capax</i>	Endangered	No
Source: U.S. Fish and Wildlife Service, 1999			

4.0 Project Diagram



Page Holder for project diagram topo map showing land acquisition areas.

5.0 Habitat Restoration and Design

5.1 Existing Ecological/Engineering Concern

Terrestrial/riparian and wetland habitats within the proposed Highland Creek Bottomland Hardwood Restoration area have been lost or severely degraded. Most of the area's bottomland hardwood forests and wetlands have been converted into agricultural land. Bottomland hardwood forests and wetlands, when intact, provide valuable year-round or seasonal habitat for a variety of species and perform important ecological functions such as water filtration and soil erosion reduction. Finally, these areas provide quality recreational opportunities.

In addition to the loss and degradation of terrestrial/riparian and wetland habitats, aquatic habitats in the project area also have been altered. Construction of dams along the Ohio River has caused changes in river levels at the mouths of smaller tributaries. Higher water in these areas causes slow movement of water out of the smaller streams resulting in slackwater embayments. Silt and other fine sediments are disposed of in the slow moving water eventually resulting in unusually shallow water depths in those areas. The shallow, silted in embayment areas provide low habitat diversity and decreased benefits for fish and other aquatic organisms. Also, the shallow water inhibits movement of boats into the smaller tributaries resulting in decreased recreational opportunities for humans. Dredging and placement of an embayment revetment structure just upstream from the mouth of Highland Creek would improve the aquatic habitats in the project area.

5.2 Land Acquisition Strategy

Land acquisition for the Highland Creek Bottomland Hardwood Restoration project would be completed in a phased approach that assigns a hierarchy for land purchases. Although the goal is to purchase any lands from willing sellers within the project area, the acquisition areas would be assigned various levels of priority. The land acquisition areas are shown in the project diagram. A project management/master plan would be developed in order to fully plan and implement a project of this magnitude.

Priority 1 Acquisition Area Approximately 1,074 acres of land located in the northernmost portion of the project area would be of highest priority for purchase because that area would provide a buffer from Ohio River flood waters for the Sloughs WMA. This area is at a high risk for soil erosion and other flood damage during flooding events. If this area could be restored into bottomland hardwood forest, it would serve as a buffer to help protect much of the land further downstream from soil erosion or other potential problems. It is believed that the landowners in those areas would have the greatest incentives to sell due to the risk of flood damage on their lands. Of highest priority within this acquisition area would be the land immediately adjacent to the Ohio River to provide a forested riparian corridor.

Priority 2 Acquisition Area Approximately 818 acres of land in the southwestern portion of the project area, adjacent to the mainstem of the Ohio River, would have second priority for acquisition. Reforestation of these areas would provide a riparian buffer similar to the lands described above. Also, reforestation of this area would complete a block of forest that would connect a large tract of existing forest in the Sloughs WMA. This area would serve as a forested corridor that may enable movement, migration, or dispersal of numerous wildlife species. Of highest priority within this acquisition area would be the land immediately adjacent to the Ohio River to provide a forested riparian buffer zone.

Priority 3 Acquisition Area The third priority for acquisition would be approximately 61 acres just south of Highland Creek. Within this area a forested buffer zone would be

created adjacent to Highland Creek which would improve wildlife habitat, enhance water quality, and reduce soil erosion and sedimentation.

5.3 Bottomland Hardwood Forest/Wetland Restoration

All of the Highland Creek Bottomland Hardwood Restoration area is in the Ohio River and Highland Creek floodplains. Over 70% of the 2500 acre area is currently open land, most of which is in agricultural production. Approximately 30% of the area is currently forested. However, most of the existing forests are small, isolated, and/or narrow fragments. Some of the existing forests do however connect to larger forest tracts that are part of the Sloughs Wildlife Management Area.

Following land acquisition of the proposed area, a 300 foot-wide corridor adjacent to the Ohio River (127 acres) and Highland Creek (73 acres) would be reforested with native mast producing bottomland hardwood trees. Approximately 20% of the remaining open land in each of the areas would also be reforested (236 and 80 acres respectively). These forests would ideally connect the newly established forested buffer zone along the Ohio River to the forests in the Sloughs WMA. Based on recommendations provided the Kentucky Division of Forestry, the preferred tree species to plant in the area would include swamp chestnut oak (*Quercus michauxii*), swamp white oak (*Quercus bicolor*), overcup oak (*Quercus lyrata*), pin oak (*Quercus palustris*), cherrybark oak (*Quercus pagodaefolia*), Nuttall oak (*Quercus nuttallii*), willow oak (*Quercus phellos*), bur oak (*Quercus macrocarpa*), and bald cypress (*Taxodium distichum*). Aggressive light mast producing species, such as silver maple (*Acer saccharinum*), green ash (*Fraxinus pennsylvanica*), sycamore (*Platanus occidentalis*), eastern cottonwood (*Populus deltoides*), and willows (*Salix spp.*), would be allowed to reestablish themselves through natural seed dispersal from nearby forests.

Soil types, hydrology, and terrain position will be the primary factors considered when selecting the tree species to be planted in each area. A detailed planting design, which would be part of the overall project management/master plan, should be developed in order to insure that the planting effort is successful. Costs for reforestation efforts, based on assumptions provided by the Kentucky Division of Forestry, are shown on Table 2.

Open areas that are not reforested will be maintained in order to provide habitat diversity. Mowing, burning, and/or tilling may be used to maintain these open areas. Depending upon the type of wildlife management prescribed in the project management plan, other openings such as foodplots or agricultural outleasings may be desirable to provide increased foraging opportunities for a variety of species. Following land acquisition, potential wetland areas or moist soil units should be identified. Some of these areas may need to be improved by establishing hydrologic modifications such as the addition of water control structures and small levees. Plans for such structures would be developed when the land acquisition stages have started and potential wetland/moist soil areas identified.

5.4 Highland Creek Embayment

Dredging - Maintenance dredging of the mouth of the embayment is required to reestablish a suitable depth for boater access and to provide a suitable sub-grade for the rock revetment at the mouth. An estimated 36,000 cubic yards of silty-clay material would be dredged to restore depths of 9-12 feet in the embayment mouth. A dredge disposal site is adjacent to the embayment, with a natural swale. A small levee, 3.5 feet high and 800 feet in length, would be constructed at the designated 10 acre disposal site for dewatering.

Embayment Rock Revetment – A rock revetment has been designed to attempt to slow the rate of sedimentation. This large rock structure would provide an area of increased velocities, which would create a scour hole at the embayment mouth.

Design Features:

- ◆ The structure would extend downstream at a 60-degree angle from the channel bank for 115 feet. The structure would then turn and be parallel to the bank for 220 feet.
- ◆ The top width is 5 feet with 1.5 to 1 side slopes.
- ◆ The dike shall be toed into the sub-grade a minimum of 2 feet and stand above the channel bottom 6 feet.
- ◆ The top of the structure shall be a minimum of 3 feet below the normal pool elevation of 324.0.
- ◆ The size of the rock used shall be uniformly graded limestone with each rock weighing between 50 and 100 pounds. Normally a well-graded rock would be used, however, a uniform gradation would provide better aquatic habitat.

5.5 Planning/Engineering Assumptions

- ◆ A small auger head dredge would be used, and the material would be pumped directly to the disposal site.
- ◆ Bottom side slopes will be reshaped to a 3:1.
- ◆ All the material required for the levee would be taken from on site.
- ◆ A 2,320-gallon per minute (gpm) centrifugal pump would be used for dewatering. Dewatering would commence 10 days after dredging begins to prevent the dewatering basin from exceeding capacity.

6.0 Cost Estimate (Land Acquisition, Reforestation, and Embayment Enhancement)

Land acquisition, reforestation, dredging and embayment revetment structure construction costs are summarized on Table 2. A detailed MCACES cost estimate for the proposed project is included in Appendix C.

Table 2. Project Costs.	
Item	Costs
Prepare Project Management/Master Plan	\$25,000
Priority 1 Land Acquisition (1074 acres)	\$1,074,000
Priority 2 Land Acquisition (818 acres)	\$818,000
Priority 3 Land Acquisition (611 acres)	\$611,000
Reforest Ohio River Buffer (127 acres)	\$27,900
Reforest Highland Creek Buffer (73 acres)	\$16,000
Reforest 20% of Priority 1 and 2 Areas (236 acres)	\$51,800
Reforest 20% of Priority 3 Area (80 acres)	\$17,500
Revetment Structure	\$48,300
Dredging and Dewatering	\$62,600
Mobilization	\$25,200
TOTAL	\$2,777,300

7.0 Schedule

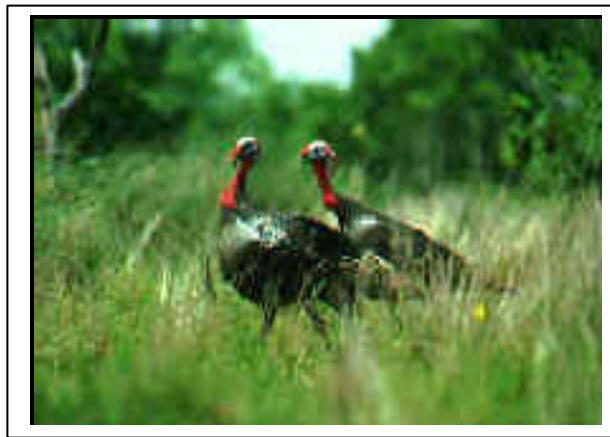
The estimated acquisition, plan development, reforestation, embayment dredging, and revetment structure construction times are shown on Table 3.

Table 3. Construction Schedule.	
Item	Time
Preparation of Management/Master Plan	1 year
Priority 1 and 2 Acquisitions	1-15 years
Priority 1 and 2 Reforestation/Development	1-15 years
Priority 3 Acquisition	1-30 years
Priority 3 Reforestation/Development	1-30 years
Construction of Embayment Revetment Structure	1 year
Dredging	2 months
TOTAL	1-30 years

8.0 Expected Ecological Benefits

Terrestrial/Riparian Habitat: Implementation of the Highland Creek Bottomland Hardwood Restoration project would result in long-term beneficial impacts to terrestrial/riparian resources. The acquisition, reforestation, and management of the floodplain/riparian area would be beneficial to many game and nongame species of wildlife. The conversion of agricultural lands to bottomland forest, coupled with the perpetual management of the area for wildlife by the KDFWR would result in sustained long-term beneficial impacts to terrestrial resources.

The acquisition, reforestation, preservation, and management of bottomland areas would benefit many species of wildlife. The establishment of a vegetated riparian corridor would provide habitat for resident and migratory wildlife species and serve as a travel corridor. Reforestation would reduce overall forest fragmentation on the area and provide habitat for many species. Likely species to be beneficially affected would include: resident bird species, such as northern bobwhite and turkey; neotropical migratory birds, such as warblers, vireos, and sparrows; and raptors, such as red-tailed hawk, northern harrier, sharp-shinned hawk, bald eagle, and barred



owl. Mammals, such as the Indiana bat, white-tailed deer, eastern cottontail, and eastern gray squirrel, and resident reptiles and amphibians would also benefit from the proposed project. In addition, important long-term beneficial impacts to migratory waterfowl, especially wood ducks, mallards, and Canada geese would be anticipated.

Aquatic Habitats: Long-term beneficial impacts to aquatic resources would be anticipated as a result of implementing the proposed project. The preservation and reforestation of the wooded riparian corridor along the Ohio River shoreline and Highland Creek would reduce potential streambank erosion and therefore reduce the amount of sediment laden runoff that enters the watershed. The conversion of agricultural land to forest would indirectly improve water quality

by reducing the amount of silt and contaminants from entering the Ohio River and Highland Creek via stormwater runoff.

Dredging of the mouth of Highland Creek would result in long-term beneficial impacts to fishes due to the improved/deepened access to the Highland Creek embayment during low flow periods and would provide increased habitat diversity. Habitat requirements for fishes change seasonally and improved access to the embayment would be considered beneficial. Restoring/increasing the depths of the embayment would provide over-wintering habitat for numerous fishes.

The creation of seasonally flooded bottomland habitats would benefit aquatic resources on the area by providing nursery, foraging, spawning, and refuge areas for many fish species.

Wetlands: Restoration and creation of bottomland hardwood wetlands, moist soil units, and other seasonally flooded habitats would add to the amount of wetlands present on the project area. The benefits of these newly created/restored wetlands would include improved water quality, floodflow retention/reduction, groundwater recharge, and provide habitat for waterfowl and other wetland dependent species. These wetlands would provide habitat for numerous species of wildlife including furbearers, game, and non-game wildlife species.

Federally-Listed Threatened and Endangered Species: Restoration of the bottomland hardwood forests and associated wetlands would provide summer roosting habitat and foraging habitat for the endangered Indiana bat. Winter habitat for the bald eagle would also be provided as a result of implementing the proposed project.

Socioeconomic Resources: There would be long-term beneficial impacts to socioeconomic resources as a result of implementing the proposed project. Long-term benefits would be realized through improved recreational opportunities for hunting, fishing, wildlife observation, and other non-consumptive uses. Local businesses would receive indirect benefits from local expenditures associated with outdoor recreation purchases, such as hunting gear, fishing supplies, gas, food, and other necessities.

9.0 Potential Adverse Environmental Impacts

Terrestrial/Riparian Habitats: There would be no foreseeable adverse impacts to terrestrial or riparian resources as a result of implementing the proposed project.

Aquatic Habitats: There would be a potential for short-term adverse affects to aquatic species, especially immobile benthic invertebrates and young-of-the-year fishes during the dredging of the Highland Creek embayment. Localized populations of benthic invertebrates could be directly disturbed during the construction operation. In addition, sensitive aquatic species immediately downstream from the site could be adversely impacted by degraded water quality associated with displaced sediments, however these adverse impacts to aquatic species would be short term.

Wetlands: There would be no foreseeable adverse impacts to jurisdictional wetlands as a result of implementing the proposed project.

Federally-Listed Threatened and Endangered Species: There would be no foreseeable adverse impacts to federally-listed threatened or endangered species as a result of implementing the proposed project.

Socioeconomic Resources: There would be potential long-term direct adverse socioeconomic impacts to local farmers as a result of implementing the proposed project. There

would be indirect long-term adverse impacts to local businesses that support the agricultural community.

10.0 Mitigation

Minor impacts associated with dredging and construction of an embayment revetment structure may occur with implementation of this project, however, no significant adverse impacts are expected. The use of best management practices and proper construction techniques would minimize adverse water quality impacts. No mitigation measures would be necessary to complete this project.

11.0 Preliminary Operation and Maintenance Costs:

Operation and maintenance costs are summarized on Table 4.

Table 4. Operation and Maintenance Costs		
Maintenance	Frequency	Costs
Maintenance Dredging	2 - 25 years	\$16,000
Embayment Revetment Structure Maintenance	25 years	\$10,000
TOTAL		\$26,000

12.0 Potential Cost Share Sponsor(s)

- ◆ Kentucky Department of Fish and Wildlife Resources
- ◆ Kentucky Land Heritage Trust
- ◆ The Nature Conservancy
- ◆ Ducks Unlimited

13.0 Expected Life of the Project

As presently envisioned, the Highland Creek project area would be managed in perpetuity for the benefit of natural resources by the KDFWR.

14.0 Hazardous, Toxic, and Radiological Waste Considerations

Potential impacts of hazardous, toxic, and radiological waste (HTRW) at the site were visually assessed during a site visit.

Site Inspection Findings.

The project site is located in the lower reaches of Highland Creek, which flows along the south edge of Sloughs WMA in Union County, Kentucky. The creek enters the Ohio River at ORM 841.9. Uniontown, Kentucky is located immediately south of the mouth of Highland Creek on the Ohio River.

The following environmental conditions were considered when conducting the July 15, 1999 project area inspection:

- ◆ Suspicious/Unusual Odors;
- ◆ Discolored Soil;
- ◆ Distressed Vegetation;
- ◆ Dirt/Debris Mounds;
- ◆ Ground Depressions;
- ◆ Oil Staining;
- ◆ Above Ground Storage Tanks (ASTs);
- ◆ Underground Storage Tanks (USTs);
- ◆ Landfills/Wastepiles;
- ◆ Impoundments/Lagoons;
- ◆ Drum/Container Storage;
- ◆ Electrical Transformers;

OHIO RIVER MAINSTEM ECOSYSTEM RESTORATION PROJECT

- ◆ Standpipes/Vent pipes;
- ◆ Surface Water Discharges;
- ◆ Power or Pipelines;
- ◆ Mining/Logging; and
- ◆ Other.

Agricultural land and the Sloughs WMA are in the project area.

HTRW Findings and Conclusions

None of the environmental conditions listed above were observed in the project area during the site visit.

15.0 Property Ownership & River Access

Table 5. Property Characteristics				
Site Name: Highland Creek Bottomland Hardwood Restoration				
Location: Union County, Kentucky				
Map/Parcel Number	Owner	Mailing Address	Market Value	Acreage
59/1	Damien Elder	1216 SR 948 Morganfield, KY 42437	\$ 138,400	100.00
59/2-1	Marie Lambert, et al	822 South Elm St. Henderson, KY	\$?	217.00
59/4	Damien Elder	1216 SR 948 Morganfield, KY 42437	\$ 91,000	65.00
59/5	A. B. & George Hite	5608 SR 141 N Uniontown, KY 42461	\$ 127,500	93.00
	Joseph French	1121 West Mill Road Evansville, IN		
59/6	George Stannus	1889 Bayshore Drive Rockport, TX 78382	\$ 184,200	206.00
59/7	City of Morganfield	C/o City Water Department Morganfield, KY 42437	(not listed)	9.40
59/8	Gregory Greenwell	404 SR 666 Uniontown, KY 42461	\$ 86,000	81.00
59/9	Waller, Chapman & Gordon Ruark	440 East Main St. Morganfield, KY 42437	\$ 25,400	38.00
59/9-1	U.S. Government		(not listed)	77.48
59/10	Marie Waller, et al	C/o Lyle Waller II 3988 U.S. Hwy 60 W Morganfield, KY 42437	?	40.26
59/10-1	U.S. Government			153.10
59/11	Matt Robinson	P.O. Box 535 Uniontown, KY 42461	\$ 32,500	49.25
59/11-1	Nora Roberts	1793 Waverly Road Uniontown, KY 42461	\$ 128,000	110.00
59/12	U.S. Government			142.00
59/16	J.C. Hamilton EST	C/o Elizabeth McClure One McClure Lane Chico, CA 95928	\$ 60,000	90.00

Table 5. Property Characteristics				
Site Name: Highland Creek Bottomland Hardwood Restoration				
Location: Union County, Kentucky				
Map/Parcel Number	Owner	Mailing Address	Market Value	Acreage
59/17 (includes parcel 72/8)	Waller & Chapman Ruark	440 East Main St. Morganfield, KY 42437	\$ 702,800	722.00
72/8 (included in parcel 59/17)	Waller & Chapman Ruark	440 East Main St. Morganfield, KY 42437		
72/8-1	Marie Waller, et al	C/o Lyle Waller II 3988 U.S. Hwy 60 W Morganfield, KY 42437	\$ 278,800	278.00
72/10	Damien Elder	1216 SR 948 Morganfield, KY 42437	\$ 165,900	132.00
72/11 (includes parcel 73/01-1)	Marie Lambert	C/o William Lambert II 18 Lindworth Lane St. Louis, MO 63124	\$ 204,000	150.00
72/13	Waller, Chapman & Gordon Ruark	440 East Main St. Morganfield, KY 42437	\$ 126,000	157.00
72/14-1	Waller, Chapman & Gordon Ruark	440 East Main St. Morganfield, KY 42437	\$?	60.38
73/12 (includes parcels 73/13 and 73/18)	Joseph Mally	11664 SR 360 Uniontown, KY 42461	\$ 678,970	392.00
73/15	Josephine Drury	5149 U.S. Hwy 60 E Waverly, KY 42462	\$ 171,700	125.00
73/16	Consolidation Coal Co.	1800 Washington Rd. Pittsburgh, PA 15241-1421	\$ 152,200	113.00
* Denotes improvements on property.				

16.0 References

References:	
INHS, 1996	Illinois Natural History Survey Reports, March-April 1996. Survey Document #2152. Center for Biodiversity (J. Hofmann).
USFWS, 1983	U.S. Fish and Wildlife Service, 1983. Northern States Bald Eagle Recovery Plan. USFWS Denver, Colorado
USFWS, 1983	U.S. Fish and Wildlife Service, 1983. Recovery Plan for the Indiana bat (<i>Myotis sodalis</i>).
USFWS, 1999	U.S. Fish and Wildlife Service, August 6, 1999. Federally Listed Endangered and Threatened Species in Kentucky.

APPENDIX A Threatened & Endangered Species

APPENDIX B Plan Formulation and Incremental Analysis Checklist

Project Site Location: The proposed Highland Creek Bottomland Hardwood Restoration area consists of approximately 2,500 acres and is located in Union County, Kentucky just northeast of the town of Uniontown. The project area is located adjacent to Myers Pool between Ohio River Miles (ORM) 838.5-842. The Kentucky Department of Fish and Wildlife Resources (KDFWR) Sloughs Wildlife Management Area (WMA) borders much of the proposed project area. The project site is within the jurisdiction of the Louisville District, U.S. Army Corps of Engineers (USACE).

Description of Plan selected: The main goal of this project is to restore bottomland hardwood forests and wetlands within the project area and provide a buffer to the existing publicly-owned bottomland hardwood forest and wetlands. Most of the land within the proposed project area is privately-owned agricultural land that would be purchased from willing sellers. Reforestation efforts would follow recommendations provided by the Kentucky Division of Forestry.

A secondary goal of this project is to improve the embayment area near the mouth of Highland Creek to enhance aquatic habitat for fish and improve accessibility for boating. This would require construction of an embayment revetment structure and dredging near the mouth of Highland Creek.

Alternatives of the Selected Plan:

Smaller Size Plans Possible? Yes. Reduce the amount of land acquisition, reforestation, and dredging.

Larger Size Plan Possible? No

Other alternatives? Yes. Purchase long-term easements for reforestation.

Restore/Enhance/Protect Terrestrial Habitats? ☒ Yes Objective numbers met ☒ T1, T3

Restore, Enhance, & Protect Wetlands? ☒ Yes Objective numbers met ☒ W1

Restore/Enhance/Protect Aquatic Habitats? ☒ Yes Objective numbers met ☒ A1, A6, A7, A8

Type species benefited:

Migratory waterfowl, neotropical migrant birds, raptors, fishes, mammals, reptiles, and amphibians.

Endangered species benefited: bald eagles and Indiana bats

Can estimated amount of habitat units be determined: Approximately 516 acres would be restored with bottomland hardwood forests and associated wetlands, an additional 987 acres would be acquired for wildlife management, and 3 acres of embayment would be restored.

Plan acceptable to Resources Agencies?

U.S. Fish & Wildlife Service?

State Department of Natural Resources?

Yes Kentucky DFWR

Plan considered complete?

Connected to other plans for restoration?

Real Estate owned by State Agency? No

Federal Agency? Yes

Real Estate privately owned? Yes

If privately owned, what is the status of future acquisition? Acquisition or agreements will be required.

Does this plan contribute significantly to the ecosystem structure or function requiring restoration? What goal or values does it meet in the Ecosystem Restoration Plan?

Provide terrestrial habitat diversity, migratory bird habitat, seasonal aquatic habitat, and increased/enhanced wetland habitat.

Is this restoration plan a part of restoration projects planned by other agencies? (i.e. North American Waterfowl Management Plan, etc.)

No.

In agencies opinion is the plan the most cost effective plan that can be implemented at this location?

Can this plan be implemented more cost effectively by another agency or institution?

Yes / No

Who:

From an incremental cost basis are there any features in this plan that would make the project more expensive than a typical project of the same nature? For embayment type plans is there excessive haul distance to disposal site? More expensive type disposal? Spoil that requires special handling/disposal?

Potential Project Sponsor:

Government Entity:_____

Non-government Entity _____

Corps Contractor _____ Date _____

U.S. Fish & Wildlife Representative _____ Date _____

State Agency Representative _____ Date _____

U.S. Army Corps of Engineers Representative _____ Date _____

Terrestrial Habitat Objectives

- T1 Riparian Corridors
- T2 Islands
- T3 Floodplains
- T4 Other unique habitats (canebrakes, river bluffs, etc.)

Wetland Habitat Objectives

- W1 Forested Wetlands: Bottomland Hardwoods
- W2 Forested Wetlands: Cypress/Tupelo Swamps and other unique forested wetlands
- W3 Scrub/Shrub Emergent Wetlands: isolated from the river except during high water and contiguous (includes scrub/shrub wetlands in embayments and island sloughs)

Aquatic Habitat Objectives

- A1 Backwaters (sloughs, embayments, oxbows, bayous, etc.)
- A2 Riverine submerged and aquatic vegetation
- A3 Sand and gravel bars
- A4 Riffles/Runs (tailwaters)
- A5 Pools (deep water, slow velocity, soft substrate)
- A6 Side Channel/Back Channel Habitat
- A7 Fish Passage
- A8 Riparian Enhancement/Protection

APPENDIX C Micro Computer-Aided Cost Engineering System (MCACES)